EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	185	(front adj side) same ((back or rear) adj side) same (wafer or substrate or workpiece) same defects	US-PGPUB; USPAT	OR	ON	2006/06/27 17:38
L2	187	(front adj side) same ((back or rear) adj side) same (wafer or substrate or workpiece or specimen) same defects	US-PGPUB; USPAT	OR	ON	2006/06/27 16:12
L3	144	2 and @ad<"20021004"	US-PGPUB; USPAT	OR	ON	2006/06/27 17:37
L4	14	(top adj side) same ((back or rear) adj side) same (wafer or substrate or workpiece) same defects	US-PGPUB; USPAT	OR	ON	2006/06/27 17:42
L5	10	4 and @ad<"20021004"	US-PGPUB; USPAT	OR	ON	2006/06/27 17:37
L6	7	5 not 3	US-PGPUB; USPAT	OR	ON	2006/06/27 17:37
L7	0	(active adj side) same (nonactive adj side) same (wafer or substrate or workpiece) same defects	US-PGPUB; USPAT	OR	ON	2006/06/27 17:38
L8	0	(active adj side) same (nonactive adj side) same (specimen) same defects	US-PGPUB; USPAT	OR	ON	2006/06/27 17:43
L9	24	(front adj side) same ((back or rear) adj side) same (wafer or substrate or workpiece) same defects	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/06/27 17:39
L10	1	(top adj side) same ((back or rear) adj side) same (wafer or substrate or workpiece) same defects	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/06/27 17:42
L11	0	(active adj side) same (nonactive adj side) same (specimen) same defects	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/06/27 17:43

DOCUMENT-IDENTIFIER: US 20020186368 A1

TITLE: Systems and methods for inspection of specimen
surfaces

---------- KWIC ---------

Detail Description Paragraph - DETX (62):

[0118] The method may be used to determine a presence of any of the **defects** described in the above embodiments. The method may include determining a presence of **defects on the front side** surface or the **back side** surface of a **specimen**. Additionally, the method may include determining a presence of **defects on the front side** surface and the **back side** surface of a **specimen** substantially simultaneously.

US-PAT-NO: 6825487

DOCUMENT-IDENTIFIER: US 6825487 B2

TITLE: Method for isolation of wafer support-related crystal defects

---------- KWIC ---------

Detailed Description Text - DETX (7):

Various measurements and observations on the **wafer** were noted to identify crystal **defects**. First, a KLA Tencor Surfscan SP-1 inspection system (SP-1) was used on the **front side** to look for lightscattering **defects**. **Front side** slip inspection was then performed using a microscope. Then, a **back side** halogen or other high intensity light inspection was performed. SIRD measurement was subsequently performed. Then, SP-1 inspection was performed on the **back side**. A scanning electron microscope was then used on the **back side defects** followed by optical inspection of **back side defects** using a microscope. Finally, optical microscope inspection was performed on the susceptor to locate **defects**. Following these measurements, the **back side defects** were bevel polished and Wright etched for 1.5 minutes to measure the damage depth of the **defects**.

Detailed Description Text - DETX (8):

The post reactor SP-1 measurement found the following information: 4 localized light scattering **defects** of .gtoreq.0.13 .mu.m, 0 scratches, 0 slip, and 2 area counts (0.000 mm.sup.2). See FIG. 2, which is an output from a KLA-Tencor surface scan tool SP-1. The microscope slip inspection found no **front side** slip. The **back side** H light inspection found the typical susceptor ring visible and several particles (count <5). See FIG. 3, which also is an output from a KLA-Tencor surface scan tool SP-1. Also see FIG. 4 showing possible **defects**. Several high spots of heights of about 20-50 .mu.m were identified on the susceptor that correspond to **defect** locations on the **wafer** uncovered during the subsequent SIRD. A small pinhole of about 0.5 mm diameter was located approximately 2 mm away from the high spot corresponding to **defect** 3. See FIGS. 6C-D.

Detailed Description Text - DETX (14):

Various measurements and observations on each **wafer** were noted. First, prior to subsequent measurements, the graphite susceptor was etched to remove any deposited silicon, marked and removed. Then, SP-1 inspection was performed on the **front side of each wafer**. **Front side** slip inspection was then performed using a microscope. Then, a **back side** halogen light inspection was performed. SIRD measurement was subsequently performed on the **back side**. Then, SP-1 inspection was performed on the **back side**. A scanning electron microscope was then used on the **front side and back side defects** followed by optical microscope inspection performed on the susceptor to locate the source of repeating **defects**.

US-PAT-NO: 6401008

DOCUMENT-IDENTIFIER: US 6401008 B1
See image for Certificate of Correction

TITLE: Semiconductor wafer review system and method

---------- KWIC ---------

Detailed Description Text - DETX (9):
For **wafers** that are acceptable after having reviewed the **front sides,** visual inspection of the **back sides of the wafers** is desirable to review the **back side defects**. The cassette of **wafers** is moved to the second microscope review station 110. Each **wafer** selected for visual review and prior to being staged under the microscope of station 110, is flipped by **wafer** inverter 116 in order to expose the **back side of the wafer** to the microscope. The **back side** inspection data is transmitted from the control system 102 to the review station 110, and the review station positions each **wafer** under the microscope in response to the **back side** inspection data.

Detailed Description Text - DETX (19):
When all the **wafers have had their back sides** laser scanned, step 422 directs control to step 426 of FIG. 4B where **wafers** are selected for visual review. The selection may be made based on the reflected image of a laser scanned **wafer** possessing certain characteristics indicative of **defects**. The selected **wafers** are moved to a **front side** microscope review station at step 428, and at step 430 the selected **wafers** are reviewed. **Front side** inspection data is transmitted from the control system to the **front side** review station for the purpose of positioning the **wafers** under the microscope to view the **defects**.

Detailed Description Text - DETX (21):
The first selected **wafer** is removed from the cassette at step 434, and at step 436 the **wafer** is flipped to expose the **back side** for review with a microscope. The **wafer** is then moved to the microscope stage, and using the **back side** inspection data transmitted from the control system, the **wafer** is positioned under the microscope to provide a view of a selected **defect,** as shown by step 438. After the **back side of the wafer** is reviewed at step 440, the **wafer** is again flipped to return it to having its **front side** exposed at step 442. The **wafer** is then replaced in the cassette at step 444, and steps

446 and 448 continue the process of **back side** review until all the selected **wafers** have been processed.

US-PAT-NO: 6156580

DOCUMENT-IDENTIFIER: US 6156580 A
See image for Certificate of Correction

TITLE: Semiconductor wafer analysis system and method

---------- KWIC ---------

Brief Summary Text - BSTX (9):
In another method, a **front side of a wafer** is laser scanned. The **front side** inspection data is transmitted to a control computer, and the **wafer** is thereafter inverted, whereby a **back side of the wafer** is exposed for laser scanning. The **back side of the wafer** is laser scanned and **back side** inspection data is transmitted to a control computer. The **wafer** is inverted after laser scanning the **back side** and then moved to a microscope review station. The **front side** inspection data is downloaded to the microscope review station, and the **wafer** is positioned under the microscope at the **defect** positions indicated by the **front side** inspection data. The **wafer** is inverted, whereby a **back side of the wafer** is exposed for review, and the **back side** inspection data is downloaded to the microscope review station. The **wafer** is positioned under the microscope at the **defect** positions indicated by the **back side** inspection data.

Brief Summary Text - BSTX (10):
In yet another method for analysis of semiconductor **wafers,** a cassette containing a plurality of **wafers** is moved to a first inspection station that laser scans the **front side**. The **front sides of the wafers** are laser scanned and **front side** inspection data is transmitted to a control computer. The **wafers** are inverted, whereby **back sides of the wafers** are exposed for laser scanning, and the **back sides of the wafers** are laser scanned. The **back side** inspection data is transmitted to a control computer, and the **wafers** are inverted after laser scanning the **back sides** and replaced in the cassette. The cassette of **wafers** is moved to a microscope review station, and the **front side** inspection data is downloaded to the microscope review station. The **wafers** are positioned under the microscope at the **defect** positions indicated by the **front side** inspection data. The **wafers** are inverted, whereby **back sides of the wafer** are exposed for review, and the **back side** inspection data is downloaded to the microscope review station. The **wafers** are positioned under the microscope at the **defect** positions indicated by the **back side** inspection data.

Detailed Description Text - DETX (9):

For **wafers** that are acceptable after having reviewed the **front sides,** visual inspection of the **back sides of the wafers** is desirable to review the **back side defects**. The cassette of **wafers** is moved to the second microscope review station 110. Each **wafer** selected for visual review and prior to being staged under the microscope of station 110, is flipped by **wafer** inverter 116 in order to expose the **back side of the wafer** to the microscope. The **back side** inspection data is transmitted from the control system 102 to the review station 110, and the review station positions each **wafer** under the microscope in response to the **back side** inspection data.

Detailed Description Text - DETX (19):

When all the **wafers have had their back sides** laser scanned, step 422 directs control to step 426 of FIG. 4B where **wafers** are selected for visual review. The selection may be made based on the reflected image of a laser scanned **wafer** possessing certain characteristics indicative of **defects**. The selected **wafers** are moved to a **front side** microscope review station at step 428, and at step 430 the selected **wafers** are reviewed. **Front side** inspection data is transmitted from the control system to the **front side** review station for the purpose of positioning the **wafers** under the microscope to view the **defects**.

Detailed Description Text - DETX (21):

The first selected **wafer** is removed from the cassette at step 434, and at step 436 the **wafer** is flipped to expose the **back side** for review with a microscope. The **wafer** is then moved to the microscope stage, and using the **back side** inspection data transmitted from the control system, the **wafer** is positioned under the microscope to provide a view of a selected **defect,** as shown by step 438. After the **back side of the wafer** is reviewed at step 440, the **wafer** is again flipped to return it to having its **front side** exposed at step 442. The **wafer** is then replaced in the cassette at step 444, and steps 446 and 448 continue the process of **back side** review until all the selected **wafers** have been processed.

US-PAT-NO: 5980720

DOCUMENT-IDENTIFIER: US 5980720 A

TITLE: Methods of treating crystal-grown wafers for surface defect analysis

---------- KWIC ---------

Abstract Text - ABTX (1):

Methods of treating **wafers** for analyzing **defects** present therein comprise providing **wafers having front side** surfaces comprising defective portions and a **back side** surfaces opposite thereto; and decorating the defective portion of the **front side of the wafer** with copper.

Brief Summary Text - BSTX (19):

These and other objects and advantages are provided by the present invention. In a first aspect, the invention provides methods of treating **wafers** for analyzing **defects** which comprise providing **wafers having front side** surfaces and **back side** surfaces opposite thereto. The **front side** surfaces comprise **defect**-containing portions. The **defect**-containing portions on the **front sides of the wafers** are then decorated with copper to allow the **wafers** to be analyzed.

Brief Summary Text - BSTX (20):

In a second aspect, the invention provides other methods of treating **wafers**. The methods comprise providing **wafers having front side** surfaces comprising **defect**-containing portions and **back side** surfaces opposite thereto. Insulation films are then formed on the **front side** surfaces of the **wafers**. The **back sides of the wafers** and the insulation films are removed from the **wafers** to expose the **defect**-containing portions. The exposed **defect**-containing portions of the **wafers** are decorated with electrolytes such that the **wafers** may be subsequently analyzed.

Detailed Description Text - DETX (3):

In a first aspect, the invention provides methods of treating **wafers** for analyzing **defects** present therein. The methods comprise providing **wafers having front side** surfaces and **back side** surfaces opposite thereto. The **front side** surfaces comprise **defect** containing portions. Insulation films are preferably formed on the **front side** surfaces of the **wafers, and the back sides**

of the wafers (preferably portions of the **back sides**) are preferably etched. The etching steps are preferably performed using hydrogen fluoride in the gaseous phase. The defective portions on the **front sides of the wafers** are then decorated with copper to allow the **wafers** to be analyzed.

Detailed Description Text - DETX (8):

The invention also relates to other methods of treating **wafers** for analyzing **defects** present thereon. The methods comprise providing **wafers having front side** surfaces comprising **defect**-containing portions and **back side** surfaces opposite thereto; forming insulation films on the **front side** surfaces of the **wafers**; etching the **back side** surfaces of the **wafers**; removing the insulation films from the **wafers** to expose the **defect**-containing portions; and decorating the exposed **defect**-containing portions of the **wafers** with electrolytes. Electric fields may be formed on the front and **back sides of the wafers** to further assist in preparing the **wafers** for analyses. The electric fields typically range from about 3 MV/cm to about 10 MV/cm. The above methods may also encompass the embodiments described hereinabove.

Claims Text - CLTX (2):

providing a **wafer having a front side** surface and a **back side** surface opposite thereto, the **front side** surface of the **wafer** comprising a **defect**-containing portion;

Claims Text - CLTX (27):

providing a **wafer having a front side** surface and a **back side** surface opposite thereto, the **front side** surface comprising a **defect**-containing portion;

US-PAT-NO: 4732646

DOCUMENT-IDENTIFIER: US 4732646 A

TITLE: Method of forming identically positioned alignment marks on opposite sides of a semiconductor wafer

---------- KWIC ---------

Brief Summary Text - BSTX (14):
U.S. Pat. No. 4,131,487, filed on Oct. 26, 1977 and issued on Dec. 26, 1978, discloses a process for gettering a semiconductor **wafer** with a laser beam, wherein a laser beam is directed upon the **back side of the wafer** to create lattice damage and strain in the **back side**. Subsequent heating of the **wafer** releases the strain to attract mobile **defects from the front side of the wafer to the back side**.

Brief Summary Text - BSTX (16):
Identically positioned alignment marks on both the front and the **back side** of a semiconductor **wafer** are created by using a laser beam to scribe an alignment mark on the **back side of the wafer**. The wavelength of the laser beam is chosen such that it passes through the lightly doped **wafer** without absorption but is absorbed by a following heavily doped semiconductor layer to generate therein heat and resulting **defects**. The semiconductor **wafer** is then heated to cause the **defects** to migrate through the **wafer to the front side** where there is formed an identically positioned image of the mark scribed on the **back side**. This alignment process eliminates the need for a photoresist blocking mask during an etch step and makes it possible to form alignment marks on sandwich or other structures where one side is covered or otherwise inaccessible for alignment procedures.

US-PAT-NO: 4534804

DOCUMENT-IDENTIFIER: US 4534804 A

TITLE: Laser process for forming identically positioned alignment marks on the opposite sides of a semiconductor wafer

---------- KWIC ---------

Abstract Text - ABTX (1):

A laser beam is used to scribe an alignment mark on the **back side** of a lightly doped **substrate** of a silicon **wafer** containing an heavily doped internal layer. The wavelength of the laser beam is chosen such that it passes through the lightly doped **substrate** without absorption but is absorbed in the heavily doped internal layer to produce therein a **defect** which has the same position as the scribed alignment mark. Subsequent heating of the **wafer** causes the **defect** to migrate upwardly through a lightly doped epitaxial layer to the **front side of the wafer** and produce therein a visible mirror image of the scribed alignment mark.

Brief Summary Text - BSTX (3):

This invention relates generally to the field of precisely aligning photoresist masks to both the front and **back sides** of a silicon **wafer** and, more particularly, to a fixture-less process employing a laser beam for scribing and alignment mark on the **back side of a wafer** having an heavily doped interior layer in which microscopic **defects** are induced by the laser beam and, then, heating the **wafer** to cause the **defects** to propagate to the **front side of a wafer** where they appear as an identically positioned image of the alignment mark scribed on the **back side**.

Brief Summary Text - BSTX (8):

U.S. Pat. No. 4,131,487--Pearce et al discloses a process for gettering a semiconductor **wafer** with a laser beam, wherein a laser beam is directed upon the **back side of the wafer** to create lattice damage and strain in the **back side**. Subsequent heating of the **wafer** releases the strain to attract mobile **defects from the front side of the wafer to the back side**.

Detailed Description Text - DETX (6):

In both cases, the electromagnetic flux from the laser beam is dissipated as heat in the **back sides of the wafers** to form the characteristic scribe marks 26 and 28. The remaining flux continues into the lightly doped **wafer substrate** which is essentially transparent to the chosen laser wavelength. However, in FIG. 1, the laser beam continues through the remaining lightly doped layer of silicon until it hits the vacuum chuck 27 where it is either harmlessly dissipated or reflected back through and out of the **wafer**. In FIG. 2, which illustrates the first step of my invention, the laser beam 20 strikes the heavily doped region 22 where the flux couples to the free carriers produced by the high doping concentration, with a resultant increase in this region's absorption coefficient by a factor of three orders of magnitude. Since the heavily doped layer 22 is typically two or three microns thick, the absorbed power density rises dramatically, and enough so as to generate microscopic **defects** 29 in this layer. At this point, an alignment mark exists only on the **back side** 16 of the **wafer** 12 at the point 26. However, if the **wafer** is then heated, then, in a manner reminiscent of "secret ink", the scribing appears on the **front side of the wafer** as shown in FIG. 3. On the other hand, and as shown in FIG. 4 for comparison, the **wafer** 10, without the heavily doped internal layer, even though subjected to the identical heat treatment, remains blank on its **front side**. The dividing line between "heavily" doped and "lightly" doped is 3.times.10.sup.18 atoms of dopant per cubic centimeter.

Detailed Description Text - DETX (7):

It is believed that the mechanism by which propagation of **defects** occurs is as follows. The localized stress induced in the heavily doped layer 22 propagates the microscopic **defects** upwards towards the surface of the epi-layer 30 and also downward some distance into the **substrate** 24 as indicated by the reference numeral 32 in FIG. 3. The heat required to produce such **defect** propagation vertically in <100> **wafers** is relatively low. For example, the structures illustrated in FIGS. 1-4 were subjected to a quartz steam anneal at 700.degree. C. for a period of one hour. In this case, the letter P was scribed on the **back side of the wafer** and a clear mirror image of the letter was seen on the **front side of the wafer** through a high powered optical microscope. Photographs of the mirror image were taken. In other words, the effect was as if the observer were reading the original laser scribe mark right through the **wafer**.